

User Manual

Hiking Assistant

Group F

1. T-Watch

Power

1. Before using the watch for the first time, please charge it with the provided cable. The device is turned on when the hiking assistant is visible on the screen.
2. If the watch screen turns black, it indicates that it has run out of battery. Please recharge the watch in this case.

Starting a Hiking Session

1. Tap the green **START** button (figure 1) on the watch screen, while no session is running.
2. While a session is active, the watch displays step count in real-time.

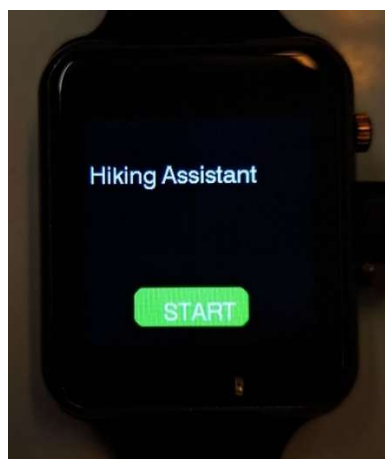


Figure 1

Stopping a Hiking Session

Tap the red **STOP** button (figure 2) on the watch screen while a session is running.



Figure 2

Saving or Discarding the Session

1. After stopping the hiking session, the watch will show the final data and ask whether to store the collected hiking data.
2. The options (figure 3) are:
 - Upload data: Tap blue **UPLOAD** button to upload the Session. You can see “Uploaded” message (figure 4) on the top of the watch screen which indicates the session is stored successfully.
Hint: The watch can only store one hiking session at a time.
 - Discard data: Tap purple **NO** button to delete the session.

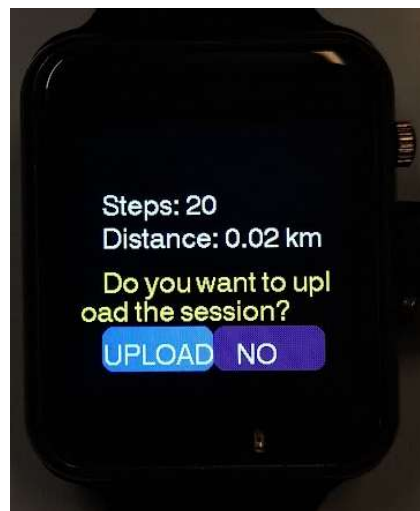


Figure 3



Figure 4

2. Raspberry Pi (RPi)

Prerequisites

1. Ensure the RPi is powered
2. Install dependencies if not already installed. Run the following commands in the terminal:

```
sudo apt update
sudo apt install python3
sudo apt install -y python3-pip python3-setuptools libglib2.0-dev
cd ~
git clone https://github.com/IanHarvey/bluepy.git
cd bluepy
python3 setup.py build
sudo python3 setup.py install
pip install flask
```

Receiving Data from Watch

1. Enable Bluetooth:

```
sudo bluetoothctl
scan on
```

2. Run the Bluetooth Receiver:

- Navigate to the project folder:

```
cd ~/Hiking-band
```

- Run the receiver script to enable Bluetooth data transfer:

```
python receiver.py
```

- Make sure to keep the smartwatch close to the RPi to establish a connection.
- After connecting, tap **UPLOAD** button to transfer session data, the new data will be stored in the database.

3. Display the website and previous session statistics:

```
python wserver.py
```

Hint: you can change the IP address of the website to match RPi's address in this file.

3. Website

1. Ensure that you are connected to the same network as the RPi to be able to see the website.
2. Open a browser and go to <http://10.100.46.99:5001>

Hint: If you have had to change the IP address in wserver.py, go the corresponding website instead.

3. Enter the default login information as follows (figure 5):

Username: user123

Password: password123

Hint: If you encounter an 'Invalid username or password' notification, please verify the username and password you entered and try again.

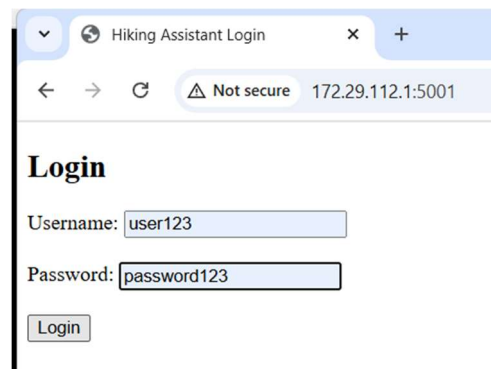


Figure 5

4. After successful login, you can view the step count, distance, corresponding time and calories burned for each session, starting from the most recent session (figure 6).

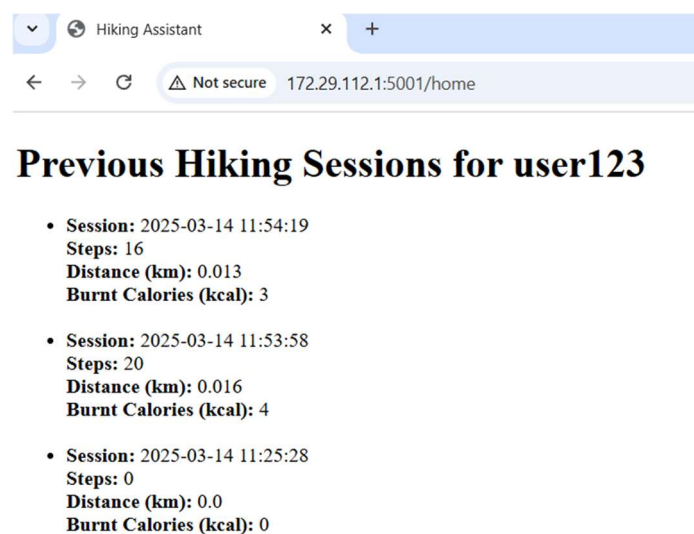


Figure 6

Test plan for Hiking Assistant

1. Testing Objectives

The goal of this test plan is to verify the correctness and stability of the smartwatch's step-counting function, Bluetooth data transmission, Raspberry Pi data processing, authentication system, and webpage generation. The key objectives are:

- Ensuring the smartwatch accurately records step counts.
- Validating data transmission between the smartwatch and Raspberry Pi through Bluetooth.
- Confirming the data on the website can only be accessed after the user enters the correct username and password.
- Ensuring the webpage correctly displays the processed data.

2. Test Scope

Test items:

- Smartwatch: Step-counting functionality.
- Bluetooth Module: Data transmission between smartwatch and Raspberry Pi.
- Raspberry Pi: Data reception, processing, and webpage generation.
- Authentication: Verify user login functionality.
- Webpage: Display of step count, distance, and calories burned.

3. Test Strategy

Testing tools:

- Smartwatch
- Raspberry Pi
- Bluetooth debugging tools (nRF Connect app)
- Web browser for webpage verification

Testing Environment:

- The smartwatch is connected to the RPi via Bluetooth.

- Use a connected monitor or a remotely controlled computer to execute the required scripts on the Raspberry Pi, processing and displaying data on a webpage.
- A web browser is used to access and verify the displayed information.

4. Test Cases

Test ID	Test case	Test Steps	Expected Result
TC01	Verify step count accuracy	1. Wear the smartwatch and start multiple sessions, walking 16, 24, 48 and 72 steps respectively. 2. Check the recorded step counts.	The smartwatch displays the step counts of 16, 24, 48 and 72.
TC02	Verify Bluetooth transmission	1. Record steps on the smartwatch. 2. Initiate Bluetooth transmission. 3. Check if the Raspberry Pi successfully receives the data.	The received data shows correctly on the RPi.
TC03	Verify authentication	1. Attempt to log in with correct and incorrect credentials. 2. Observe the system's response.	The system grants access for valid credentials and denies access for incorrect ones.
TC04	Verify webpage data display	1. Access the webpage generated by the Raspberry Pi 2. Check session list.	The webpage correctly displays datetime, step count, distance, and calories burned, sorted in descending order by datetime.
TC05	Full hiking session workflow	1. Start a session. 2. Walk for a few minutes. 3. Stop the session and upload data. 4. Open the website and login to see the data.	The entire workflow functions without errors, and the displayed data matches the recorded session.